

US GUIDED THROMBIN INJECTION FOR THE TREATMENT OF CATHETER ANGIOGRAM RELATED PSEUDOANEURYSM

Case Report

ANJİYOĞRAFI SONRASI GELİŞEN PSEUDOANEVRİZMANIN US EŞLİĞİNDE TROMBİN ENJEKTE EDİLEREK TEDAVİSİ

Tevfik Guzelbey

Yeditepe University Hospital Department of Radiology.

Aysegul Sarsilmaz

Yeditepe University Hospital Department of Radiology.

H. Onur Ozdemir

Yeditepe University Hospital Department of Radiology.

Basar Sarikaya

Yeditepe University Hospital Department of Radiology.

Corresponding Author

Tevfik Guzelbey

Yeditepe University Hospital Department of Radiology.
e-mail: tevfik.guzelbey@yeditepe.edu.tr

ABSTRACT

The authors present a case of post-catheter angiogram pseudoaneurysm treated successfully with US-guided thrombin injection with special emphasis on the technique.

Key words: Pseudoaneurysm; ultrasound; thrombin.

ÖZET

Anjiyografi sonrası gelişen pseudoanevrizmanın US eşliğinde trombin enjekte edilerek başarılı bir şekilde tedavi edilmesi ve teknikte önemli detaylarla vaka eşliğinde sunulması.

Anahtar kelimeler: Pseudoanevrizma; ultrason; trombin.

INTRODUCTION

Pseudoaneurysm at the arterial puncture site is one of the potential complications of catheter angiograms which is not very infrequently seen. Several treatment options have been suggested in the literature. Herein, we present a 86-year old male patient who was treated successfully with US guided thrombin injection with no complication.

CASE REPORT

86-year old male was referred to our department for sonographic examination of a mass in the right groin. On gray scale examination 5 cm hypoechoic mass was detected adjacent to the right common femoral artery (**figure 1a**).

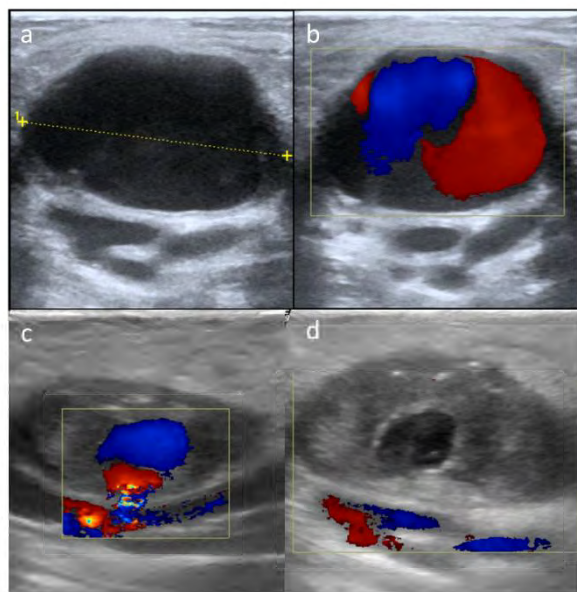


Figure 1. a and b. Gray scale (a) and Color Doppler Images (b) of the common femoral artery pseudoaneurysm at presentation. c. Color Doppler US image of the lesion posttreatment demonstrating residual flow at the center with thrombosed periphery. d. Follow-up imaging next day showing no flow within the pseudoaneurysm sac.

Color Doppler imaging was demonstrative for swirling color flow in the mass originating from the common femoral artery with to-and-fro Doppler wave pattern in the neck which were all consistent with a pseudoaneurysm (**figure 1b**).

Upon further questioning, patient's history was significant for coronary catheterization and a permanent pacemaker placement approximately 1 year ago.

Due to long-standing presence of the lesion, we deemed that it would be appropriate to treat the lesion with US guided thrombin injection. Written informed consent was obtained from patient. A preprocedural US was performed to confirm the location as well as to test the blood flow into pseudoaneurysm under manual

compression of the femoral artery higher in the groin which temporarily stopped the blood flow into the lesion. Sedoanalgesia was achieved using 1 mg of Midazolam and 100 mcg of Fentanyl. Next, right groin was cleaned with povidone-iodine and covered in usual sterile fashion. Linear 7.5 MHz array transducer (EnVisor, Philips Ultrasound, Andover MA, USA). A second operator was ready to perform the femoral artery compression whilst the first operator advanced a 20G needle into lesion under US guidance following local anesthesia achieved by 10 ml of 2% Prilocain. A schematical drawing of the technique is demonstrated in **figure 2**.

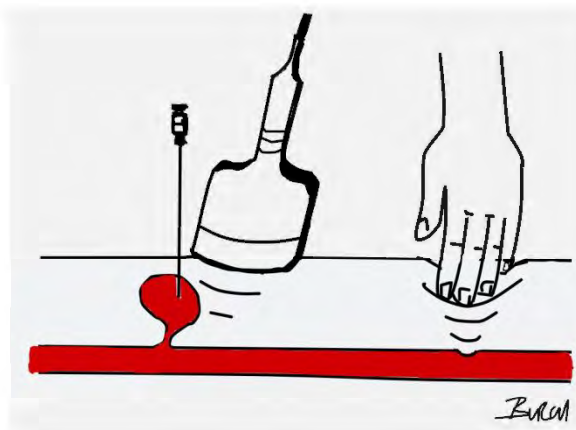


Figure 2. Schematical drawing demonstrating the needle and transducer positions while a second operator is applying pressure on the groin above the puncture site.

Pseudoaneurysm neck, femoral artery and vein and branch vessels were carefully avoided. The dorsalis pedis and posterior tibial pulses were also checked at this time.

Under US guidance with intermittent checks, a total of 2.5 ml (1 ml=1000 U) of thrombin-collagen mixture (D-stat flowable hemostat, Vascular Solutions, Minneapolis, USA) was injected into the lesion. At the end of the procedure, US showed total occlusion with no

demonstrable blood flow into the pseudoaneurysm. Patient experienced no significant symptoms and the lower extremity pulses were preserved. Patient then transferred to the ward to be checked by US later during the day.

The follow-up US on the same demonstrated 20% recanalization of the pseudoaneurysm (**figure 1c**).

Manual compression under US guidance were performed for about 40 minutes followed by compression bandage over the night. A second follow-up US study next morning demonstrated total occlusion (**figure 1d**).

Follow-up US study performed 2 weeks after the procedure again showed totally thrombosed pseudoaneurysm sac with no demonstrable neck or partial recanalization.

DISCUSSION

In the treatment of post-catheterization femoral artery pseudoaneurysm, ultrasound-guided thrombin injection has recently been increasingly preferred to ultrasound-guided compression. Because thrombin injection is effective, productive and more comfortable for the operator as well as for the patient.

Successful treatment rates of compression are about 71-99% (1) and treatment time is long. Agarwal et al. indicated a mean compression time of $104,1 \pm 63$ min to achieve a 100% occlusion rate (2). On the other hand, thrombin treatment is quick and usually be done within 15 min. and thrombin treatment success rates are 93-100% (3).

Most of the time patients receive anticoagulation and antiplatelet therapy

which further deteriorates the success rate of compression treatment (4). However thrombin is usually not affected by these medications (5).

Bovine thrombin, autologous thrombin and human derived thrombin can be used for thrombin injection treatment. But bovine thrombin usually is not preferred because of allergic reactions. Human derived thrombin has lower risk of allergic reactions. D-stat flowable hemostat, Vascular Solutions, Minneapolis, USA includes thrombin and collagen. Collagen attracts platelets, and provides strengthening of the clot.

The complication rate of thrombin injection is very low. The most common severe complication is distal embolization. However, after careful adjustment of injection speed, the rate of developing a thrombus formation is high and the enlarging thrombus ultimately gets trapped within the pseudoaneurysm sac. While thrombus is forming, manual compression of the femoral artery higher up in the groin, prevents distal embolization and this was the method we preferred in this case.

Pseudoaneurysm sac size is an important factor of treatment success. Less than 2 cm pseudoaneurysm can be treated with low volumes of thrombin (0,5 ml) [1]. We used high volumes (2,5 ml) of thrombin because of the pseudoaneurysm size as well as the longstanding nature of the lesion with presumably endothelialized neck. Initially we applied 1 ml since the blood flow was persisting on repeat US, we applied 1,5 ml again.

CONCLUSION

In the post-catheterisation femoral pseudoaneurysm treatment, US guided

thrombin injection is the preferred method of treatment over compression especially for long standing cases and in patient receiving antiplatelet and anticoagulation therapy.

REFERENCES

- 1) Vlachou, Paraskevi A.; Karkos, Christos D.; Bains, Salena; McCarthy, Mark J.; Fishwick, Guy; Bolia, Amman. Percutaneous ultrasound-guided thrombin injection for the treatment of iatrogenic femoral artery pseudoaneurysms. *European Journal of Radiology* vol. 77 issue 1 January, 2011. p. 172-174.
- 2) Agarwal R, Agrawal SK, Roubin GS, et al. Clinically guided closure of femoral arterial pseudoaneurysms complicating cardiac catheterization and coronary angioplasty. *Cathet Cardiovasc Diagn.* 1993; 30:96-100.
- 3) Morgan R, Belli AM: Current treatment methods for postcatheterization pseudoaneurysms. *J Vasc Interv Radiol* 2003; 14: 697-710.
- 4) Eisenberg L, Paulson EK, Kliewer MA, Hudson MP, DeLong DM and Carroll BA. Sonographically guided compression repair of pseudoaneurysms: further experience from single institution. *AJR* 1999; 173:1567-1573.
- 5) Lennox AF, Delis KT, Szendro G, Griffin MB, Nicolaides AN, Cheshire NJ. Dublex-guided thrombin injection for iatrogenic femoral artery pseudoaneurysm is effective even in anticoagulated patients. *Br. J Surg* 2000; 87:796-801.